

Radiation Hardened Bolometer Linear Array, Phase I

Completed Technology Project (2011 - 2011)



Project Introduction

NASA has developed space-based thermal instrument spectrometers based on thermopile detectors linear arrays that are intrinsically radiation hard. Micro-bolometers are known to offer very high sensitivity due to high thermal isolation and low thermal mass however are at present inferior to thermopiles for space-based spectrometers. In order to achieve high performance in linear array spectrometer applications, bolometers need improvement in three areas: reduced 1/f noise, stable performance over a wide system temperature range, and improved radiation hardness. Black Forest Engineering on Phase I will design bolometer and readout circuitry for linear array spectrometer applications requiring high performance in a radiation environment while also addressing signal stability/calibration and other mission requirements. The predicted performance will be compared to thermopile arrays and recommendations made for a Phase II demonstration in one or more bands of the JEO Thermal Instrument or other NASA spectrometer applications. The bolometer spectrometer architecture will also offer monolithic construction on 200 mm diameter silicon wafers and reduced cross-scan pitch if desired to support higher spatial resolution and wider FOV applications.

Primary U.S. Work Locations and Key Partners

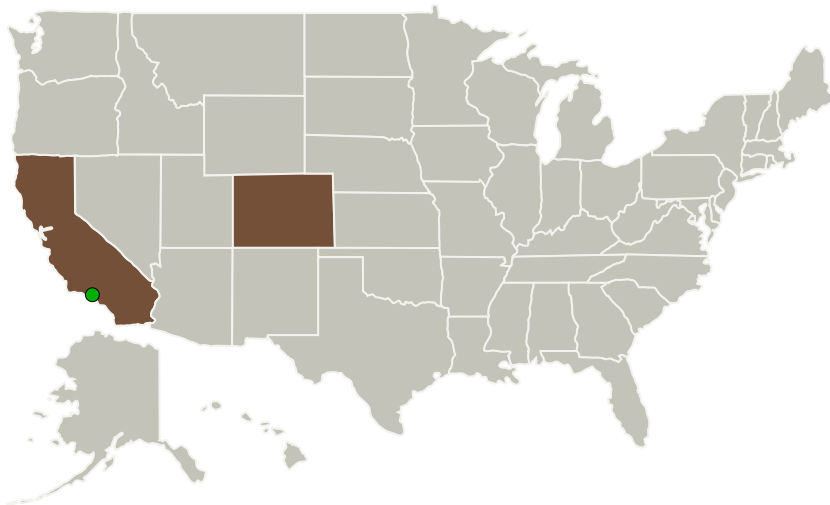
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Linear Array, Phase I

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Organizations Performing Work	Role	Type	Location
Black Forest Engineering, LLC	Lead Organization	Industry	Colorado Springs, Colorado
● Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Colorado

Project Transitions

**February 2011:** Project Start**September 2011:** Closed out**Closeout Summary:** Radiation Hardened Bolometer Linear Array, Phase I Project Image**Closeout Documentation:**

- Final Summary Chart Image(<https://techport.nasa.gov/file/138436>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Black Forest Engineering, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Stephen Gaalema

Co-Investigator:

Stephen Gaalema

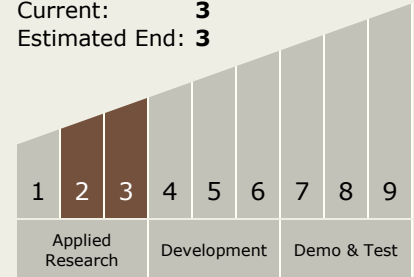
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Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System